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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/530,449
Filing Date: April 06, 2005
Appellant(s): LANKHORST ET AL.

Robert J. Crawford
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 20 August 2007 appealing from the Office action mailed 10 January 2007.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6339544	Chiang	1-2002
20020134995	Yan	9-2002

6670285	Hawker	12-2003
6141241	Ovshinsky	10-2000

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims **1-4 and 8-11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang (US 6,339,544) and Yan (US 2002/0134995).

Regarding claims **1-4**, Chiang discloses in Fig 13 an electric device with a body having: a resistor (290) comprising a phase change material (abstract) which is able to be in a first phase and in a second phase, the resistor having a surface with a first contact area (260-280) and a second contact area (300-315), the resistor having an electrical resistance between the first contact area and the second contact area, the electrical resistance having a first value when the phase change material is in the first phase (amorphous) and a second value when the phase change material is in the second phase (crystalline); a first conductor (270) electrically connected to the first contact area; a second conductor (315) electrically connected to the second contact area, the first conductor, the second conductor, and the resistor being able to conduct a current for heating of the phase change material to enable a transition from the first

Art Unit: 2814

phase to the second phase (abstract), and a layer of a dielectric material (210) for reducing a heat flow to parts of the body free of the resistor during the heating.

Chiang fails to specify that the dielectric material comprising a porous material with pores having a size between 0.5 and 50nm. Instead, Chiang discloses that the dielectric material is a low-k dielectric (col 7 ln 25-27). Chiang also does not specify the limitations of claim 2, wherein the pores have a size between 1 and 10nm. Chiang also does not specify that the pores are substantially free of water, nor that they have hydrophobic surfaces.

Yan teaches the beneficial use of porous low-k dielectrics as interlevel dielectrics, which can be applied as a thin film (¶07). The zeolite material disclosed has small pores of 5nm, is hydrophobic (¶41) and free of water (¶02). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the material taught by Yan on the device of Chiang, since the material has small pores, uniform pore distribution, and the mechanical strength to be treated with CMP (¶07).

With regards to claim 8, Yan discloses the device of claim 1, wherein the low-k dielectric has porosity above 50% (¶07).

Regarding claim 9, Chiang discloses in Fig 14 the device of claim 1, wherein the resistor (290) is embedded in the body, the layer (210) being in direct contact with the resistor.

Regarding claim 10, Chiang discloses in Fig 13 the device of claim 9, wherein the first contact area (260-280) is smaller than the second contact area (300-315), and the

first conductor comprises a part (270) in direct contact with the first contact area, the part being embedded in the layer (210).

Regarding claim **11**, Chiang discloses in Fig 1 the device of claim 1, characterized in that the first conductor, the second conductor, the resistor and the layer constitute a memory element (shown in Fig 14), and the body (substrate) comprises: an array of memory cells (5), each memory cell comprising memory element (30) and a respective selection device (col 3 ln 46), and a grid of select lines (10, 20), each memory cell being individually accessible via the respective select lines connected to the respective selection device (col 3 ln 43-48). It is noted that the last line of page 3 of the claims filed 29 March 2005 have not deleted the drawing reference numbers.

Claims **5-7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang and Yan as applied to claim 4 above, and further in view of Hawker (US 6,670,285). Chiang and Yan disclose the device of claim 4, but fail to specify wherein the porous material comprises an organosilicate and the hydrophobic surfaces have hydrocarbyl groups.

Hawker teaches a composition of porous dielectric material comprising a mixture of an organosilicate (col 4 ln 2-3) and hydrocarbyl group (col 9 ln 25-31), beneficial in that this composition has an exceptionally low dielectric constant (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Hawker on the device of Chiang and Yan in order to further lower the dielectric constant.

With regards to claims **6 and 7**, Chiang, Yan and Hawker disclose the device of claim 5. The claim limitation, "wherein the porous material is obtainable by applying a liquid layer of a composition comprising tetra-alkoxysilane, hydrocarbyloxysilane, a surfactant and a solvent onto a substrate, wherein the molar ration between tetra-alkoxysilane and hydrocarbyloxysilane is 3:1 at the most, and heating the liquid to remove the surfactant and the solvent and to form the hydrophobic porous layer", describes a product-by process. The claim language "characterized in that the surfactant is a cationic surfactant, and the surfactant and the totality of alkoxysilanes are present in a molar ration greater than 0.1:1" also describes a product-by process. See MPEP 2113. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)

The device disclosed by Chiang, Yan, and Hawker meets the structural limitations of the claim language in that it comprises a porous material (organosilicate and hydrocarbyl) obtainable by the process limitations of claims 6 and 7.

Claim **12** is rejected under 35 U.S.C. 103(a) as being unpatentable over Chiang and Yan as applied to claim 11 above, and further in view of Ovshinsky (US 6,141,241). Chiang and Yan disclose a grid of select lines, but fail to specify that the selection

device of claim 11 comprises a MOSFET having a source region, drain region and a gate region, and the grid of select lines comprises N first select lines, M second select lines, and an output line, the first conductor of each memory element being electrically connected to a first region (source or drain) of the corresponding MOSFET, the second conductor of each memory element being electrically connected to the output line, a second region of the corresponding MOSFET (source or drain) region and which is free from the first region, being electrically connected to one of the N first select lines, the gate region being electrically connected to one of the M second select lines.

Ovshinsky teaches in Fig 11 an arrangement of a memory cell, comprising a MOSFET (22) and phase change storage element (24), where the first conductor of the memory element connects to a first region of the MOSFET, and the second conductor of the memory element is electrically connected to the output line (12). The second region of the MOSFET is connected to one of the N select lines (10) and the gate region of the MOSFET is connected to one of the M select lines (26). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Ovshinsky on the device of Chiang and Yan, because data impressed onto the gate line of the MOSFET in this configuration can further modify data on the phase change storage element (col 20 ln 4-7).

(10) Response to Argument

Rejection of Claims 1-4 and 8-11 under 35 U.S.C 103(a)

Appellants argue on page 4 that there is no motivation to replace Chiang's dielectric material with the material taught by Yan. This argument is not persuasive.

Chiang discloses the structure as claimed and discloses a low-k dielectric but does not specify details of the dielectric material as claimed. Yan teaches the use of low-k dielectrics and provides a specific dielectric that can be applied as a thin film, has small pores and uniform pore distribution, is relatively unaffected by the presence of moisture, and has the necessary mechanical strength to be treated by chemical and mechanical polishing (§107). This specific dielectric has all of the properties as claimed and would be obvious to use as a replacement for the low-k dielectric disclosed by Chiang.

Appellants argue on page 5 that the Yan reference teaches away from the Chiang reference because Yan discloses that low thermal conductivity is a disadvantage (Yan §103, §104), while Chiang discloses that low thermal conductivity is an advantage (Chiang col 7 ln 27). This argument is not persuasive. Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. In re Susi, 440 F.2d 442, 169 USPQ 423 (CCPA 1971). "A known or obvious composition does not become patentable simply because it has been described as somewhat inferior to some other product for the same use." In re Gurley, 27 F.3d 551, 554, 31 USPQ2d 1130, 1132 (Fed. Cir. 1994).

Yan's disclosure relating to an undesirable characteristic of a dense organic polymer (§103) and a possible shortcoming of sol-gel silica (§104) does not teach away from the use of the material used in the combination.

Rejection of Claims 5-7 under 35 U.S.C 103(a)

Appellants argue on page 6 that claims 5-7 must be reversed because of their dependency from claim 1. Claim 1 has been discussed above.

Art Unit: 2814

Rejection of Claim 12 under 35 U.S.C 103(a)


Appellants argue on page 6 that claim 12 must be reversed because of its dependency from claim 1. Claim 1 has been discussed above.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/J. C. I./ 

Examiner, Art Unit 2814

Conferees:

Ricky Mack 

Wael Fahmy 